CLAIMS:

The preceding development clearly shows the following points.

1. A method for measuring the tangential velocity of a moving target, comprising:

a) collecting data over a coherent processing interval using at least two antennas assigned to a MTI radar system, wherein data includes range position and radial velocity of the moving target;

b) performing interference using the data associated with said at least two antennas, thereby identifying the azimuth position of the moving target;

c) identifying any phase shift that may exist between said at least two antennas; and

d) identifying the azimuth velocity of the moving target based on the phase shift properties over time.

2. The method of claim 1, wherein a baselines known between said at least two antennas belonging to a single MTI radar system along with conventional radial velocity measurements acquired by the radar enable estimating at least one of the 2-D and true 3-D velocity vector for the moving target.

3. The method of claim 1, wherein tangential velocities of a target can be determined by identifying time dependence for the phase shift identified between the at least two antennas, wherein said at least two antennas are separated by a known baseline.

4. The method of claim 1, wherein the known baseline and radial velocity measurements acquired by the MTI radar system enable estimation of true 3-D velocity vectors for the moving target.

5. The method of claim 3, wherein the tangential velocity measurements require that interfering signals from the at least two or more antennas prior to complete Doppler processing of the entire set of pulses from either antenna.

6. The method of claim 3, including the step of processing the CPIs from the at least two antennas occurs in two or more subapertures allowing partial Doppler processing of each of said at least two antenna's signals, and enabling interfering of any result prior to completion of the Doppler processing.

7. The method of claim 1 wherein said step of collecting data over a coherent processing internal using at least three antennas, wherein a three-dimensional velocity vector can be estimated using said at least three antennas to form at least two non-parallel baselines including orthogonal components as viewed from the target location.

8. The radar system of claim 1, wherein said MTI radar system is ground based.

9. The radar system of claim 1, wherein said MTI radar system is airborne based.

10. A method for measuring the tangential velocity of a moving target, comprising:

a) collecting data over a coherent processing interval using at least two antennas assigned to a MTI radar system, wherein data associated with each of said at least two antennas further processed separately by;

i) performing range transformation of the data to thereby identify range position of the moving target;

ii) correcting the data by accounting for the range position;

iii) performing Doppler transform within subapertures using the data, thereby identifying radial velocity of the moving target;

iv) correcting the data by accounting for the radial velocity;

b) performing interference using the data associated with said at least two antennas, thereby identifying the azimuth position of the moving target;

c) identifying any phase shift that may exist between said at least two antennas; and

d) identifying the azimuth velocity of the moving target based on the phase shift.

11. A radar system, comprising:

an interferometric moving target indicator radar including at least two antennas; and

a tangential velocity module provided to measure the tangential velocity component of a moving target.

12. The system of claim 11, wherein multiple baselines known between said at least two antennas along with conventional radial velocity measurements acquired by the radar enable estimating the true 3-D velocity vector of a target;

13. The system of claim 11, wherein tangential velocities of a target can be measured using said radar by identifying the time dependence of the phase difference between said at least two antennas, wherein said at least two antennas are separated by a known baseline.

14. The system of claim 13, wherein tangential velocity measurement requires interfering signals from at least two or more antennas prior to complete Doppler processing of the entire set of pulses from either antenna.

15. Processing the CPIs from the at least two antennas occurs in two or more subapertures allowing partial Doppler processing of each of said at least two antenna's signals, yet still allows interfering of the result prior to completion of the Doppler processing.

16. The radar system of claim 11 further including at least three antennas, wherein a three-dimensional velocity vector can be estimated using said at least three antennas to form at least two non-parallel baselines including orthogonal components as viewed from the target location.

17. The radar system of claim 11, wherein said radar system is ground based.

18. The radar system of claim 11, wherein said radar system is airborne based.

19. The radar system of claim 11, wherein any subset of said at least two antennas is a monopulse antenna.